OPERATING MANUAL

HVAC40 series

Humidity and temperature transmitters

Hygrostats

EN

V2.0

senseca

Contents

1 Introduction

HVAC40... series transmitters and hygrostats measure temperature, relative humidity (RH) and dew point (DP) using an **interchangeable** relative humidity and temperature digital sensor.

The probe is available in different versions:

- Fixed vertical probe for wall mounting (HVAC40...**TV**)
- Fixed duct horizontal probe (HVAC40...**TO**)
- Fixed probe with 2 m cable (HVAC40...**TC.2**)

Available outputs, depending on the model:

- RS485 Modbus–RTU digital output (HVAC40**S**17…)
- 0...10 V voltage analog output (HVAC40**V**17…)
- 0...20 mA / 4...20 mA active current analog output (HVAC4017…)
- 2-wire (current loop) 4...20 mA analog output (HVAC40**A**17…)
- ON/OFF relay switch (HVAC40**R**17…)

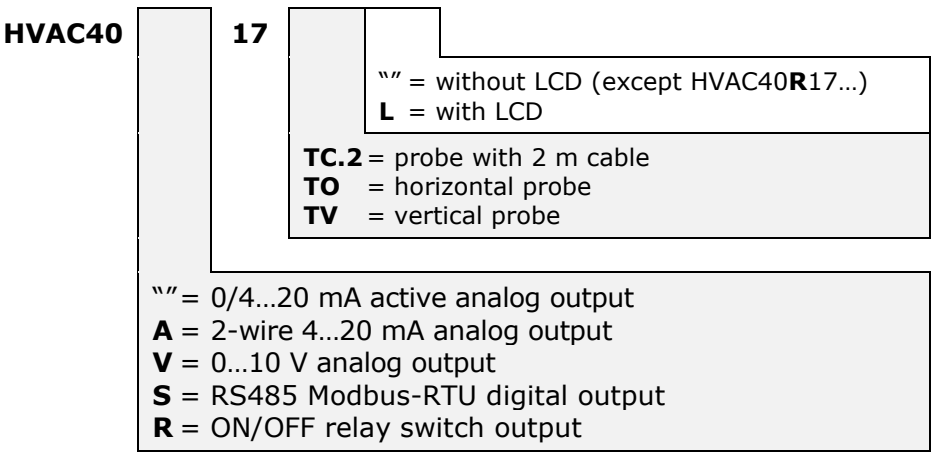
Versions with 4-digit LCD display (option L) are available, which allow the measured parameters to be displayed.

In the versions with LCD, two LED indicators indicate the presence of the power supply and of an eventual alarm condition: exceeding of the set measurements thresholds, in the versions with relay switch output; measurement detected outside the measuring range, in the versions with analog or digital output.

The instruments are factory calibrated and ready for use.

The configuration can be made by connecting the serial port of the instrument to the PC or by means of the quick configuration dip switches on the circuit board. The versions with relay switch output are equipped with two internal buttons for the configuration via display.

Models



2 Technical specifications

Sensor	**Interchangeable** digital relative humidity and temperature sensor
Measuring range RH	0…100 %RH / recommended 5…80 %RH
Temperature	-20…+80 °C
Dew Point	-20…+80 °C
Resolution RH	0.1%
Temperature	0.1 °C
Dew Point	0.1 °C
Accuracy RH	Typ. ±2.5 % (5…80 %) @ T = 15…35 °C
Temperature	Typ. ±0.3 °C @ T = -20…70 °C / ±0.5 °C @ T = remaining range
Dew Point	See the table below
Long term drift	Typ. < 0.25 %RH/year Max. 0.03 °C/year
Response time	10 s (63% of final value with 1 m/s air flow)
Output	**HVAC4017…**: active 0…20 or 4…20 mA **HVAC40V17…**: 0…10 Vdc **HVAC40A17…**: 2-wire 4…20 mA **HVAC40S17…**: RS485 Modbus-RTU **HVAC40R17…**: ON/OFF relay switch with SPDT contact
Alarm	Front red LED: exceeding of the set measurements thresholds in HVAC40R17… models, measurement detected outside the measuring range in the other models. Internal buzzer in HVAC40R17… models.
Power supply	**HVAC4017…** and **HVAC40V17…**: 24 Vac ± 10% or 18…40 Vdc **HVAC40A17…**: 15…30 Vdc **HVAC40S17…**: 12…30 Vdc **HVAC40R17…**: 24 Vac ± 10% or 15…36 Vdc
Power consumption	**HVAC4017…**: 20 mA @ 24 Vdc and Iout=12 mA **HVAC40V17…**: 4 mA @ 24 Vdc **HVAC40A17…**: equal to output signal **HVAC40S17…**: 2 mA @ 24 Vdc **HVAC40R17…**: < 1 W @ 24 Vdc
Electrical connections	Screw terminal block, max 1.5 mm^2 , PG9 cable gland
Connection to PC	RS232 serial port (except HVAC40S17…) RS485 serial port (only HVAC40S17…) Can be connected to a USB port by using the optional CP27 (except HVAC40S17…) or RS48 (only HVAC40S17…) adapter
Sensor operating conditions	-20…+80 °C. The sensor shows best performance when operated in 20…80 %RH humidity range. Long term exposure outside the indicated range (especially at high humidity) may temporarily offset the sensor response. The sensor is protected from water and dust.
Instrument operating conditions	-20…+60 °C / 0…95 %RH

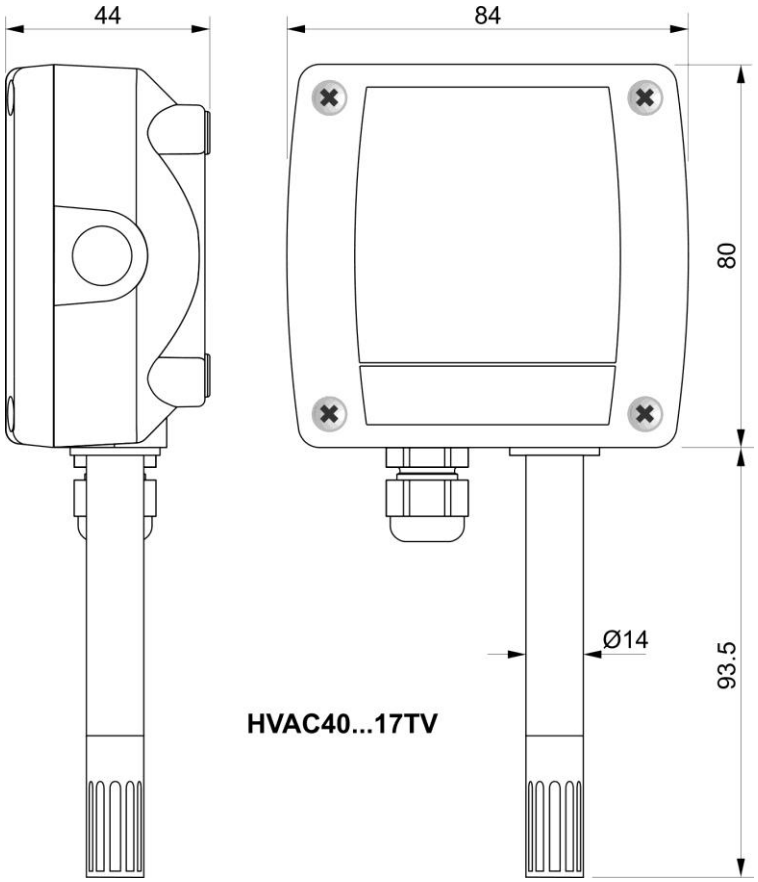
Storage temperature	-20…+80 °C
Materials	Housing: ABS Probe stem: PBT / Probe filter: PBT and 10 µm stainless steel grid
Weight	120 g approx. (*…TV models*)
Protection degree	IP65

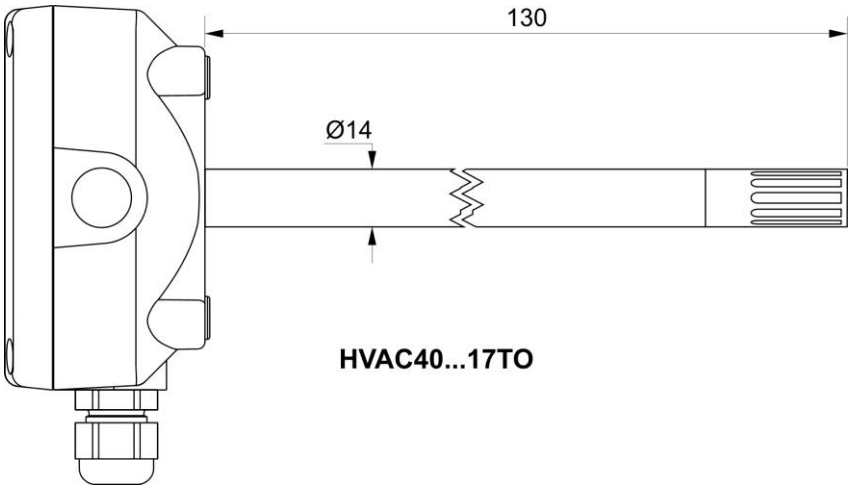
Accuracy of Dew Point (Td) measurement:

		DP °C								
		-20	**-10**	**0**	**10**	**20**	**30**	**40**	**60**	**80**
Temperature °C	**-20**	≤±1	**DP LIMIT**							
	-10	≤±1	≤±1							
	0	≤±1	≤±1	≤±1						
	10	≤±3	≤±1	≤±1	≤±1					
	20	≤±4	≤±2	≤±1	≤±1	≤±1				
	30		≤±3	≤±1.5	≤±1	≤±1	≤±1			
	40	**NOT SPECIFIED**			≤±2	≤±1	≤±1	≤±1		
	60				≤±5	≤±2.5	≤±2	≤±1	≤±1	
	80						≤±4	≤±2	≤±1	≤±1

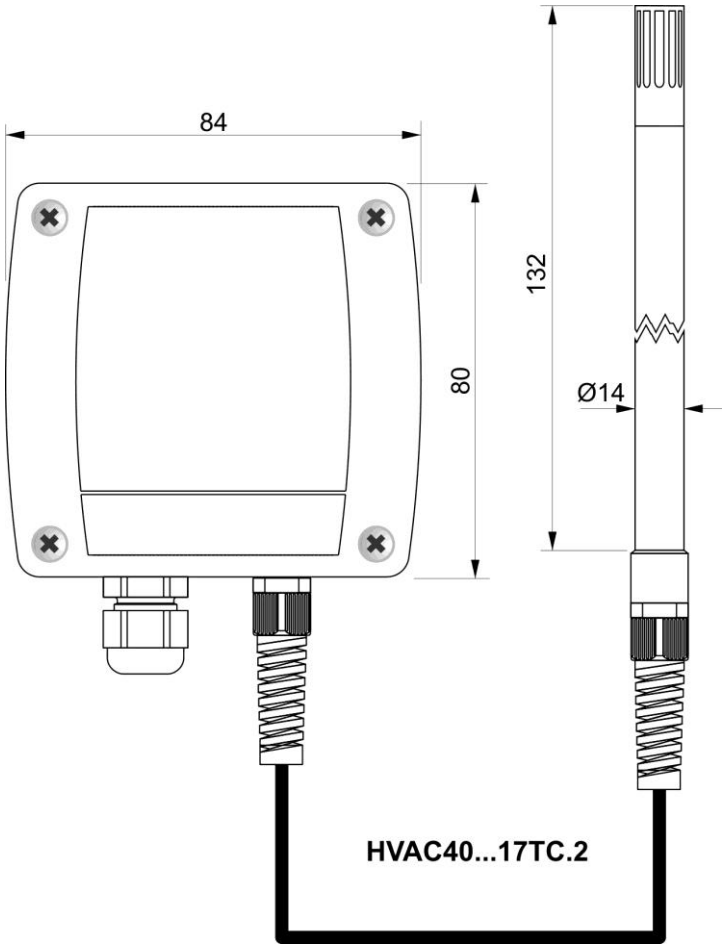
For example, at 20 °C environmental temperature, the Dew Point value of 0 °C is measured with an accuracy better than 1 °C.

Dimensions (mm)





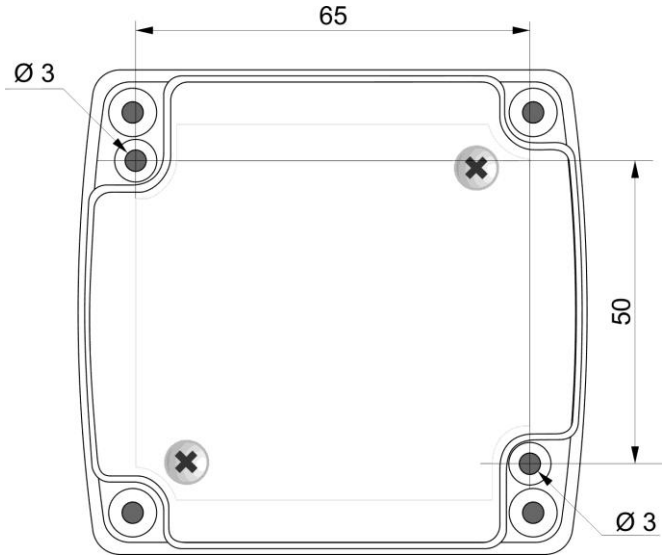
HVAC40...17TO



HVAC40...17TC.2

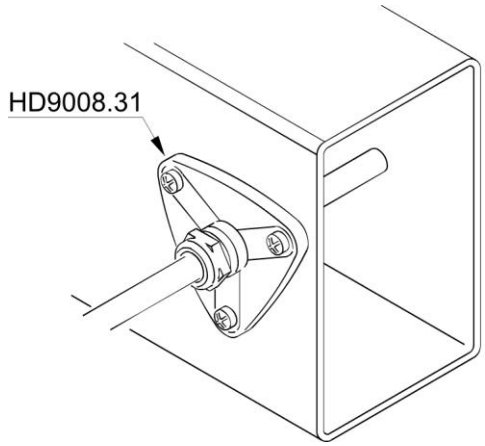
3 Installation

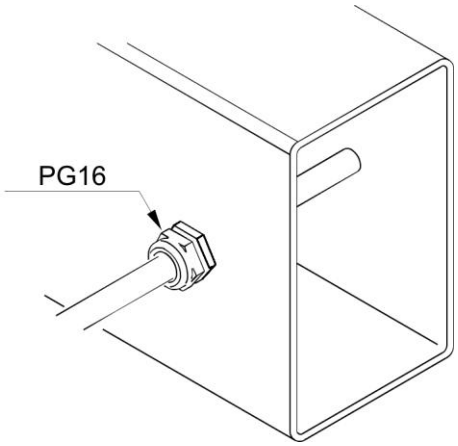
The transmitter can be wall-mounted using the two ∅3 mm holes on the back (open the cover to access the holes and the terminal header for electrical connections).

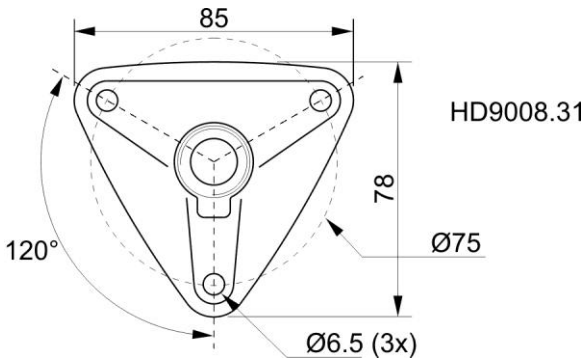


The probe can be fixed to a duct by using the **HD9008.31** flange or the **PG16** metal cable gland.

PG16 has G ½", L=8 mm thread on duct side.

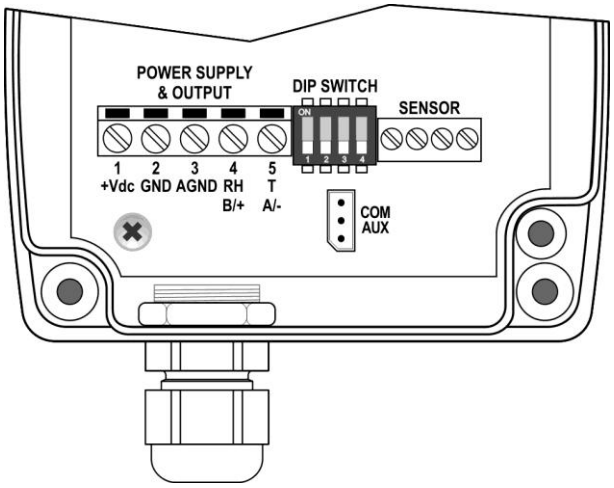


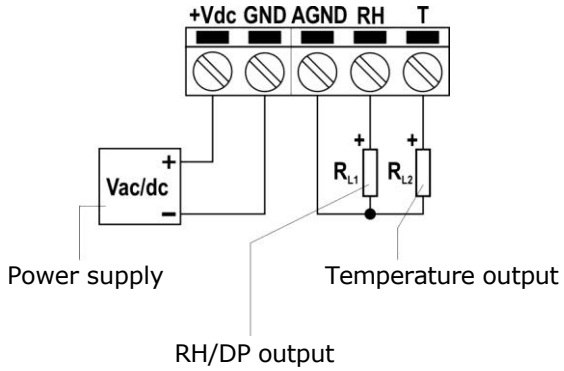




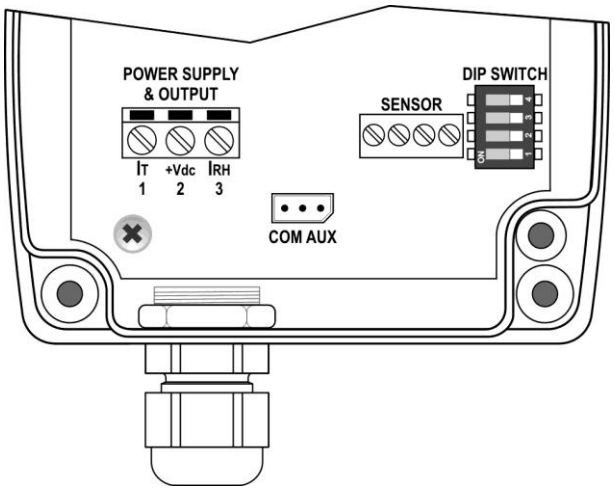
3.1 Electrical connections

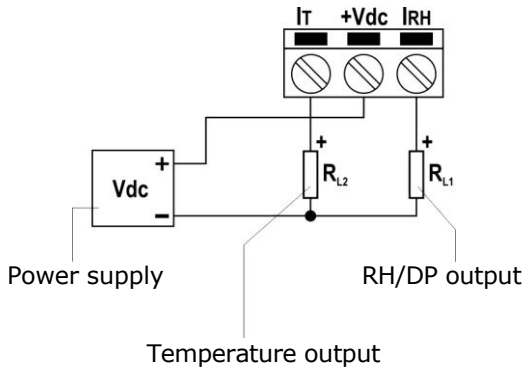
Internally there are the terminal header for connecting the power supply and the output and the RS232 serial connector (COM AUX, except HVAC40S17…).



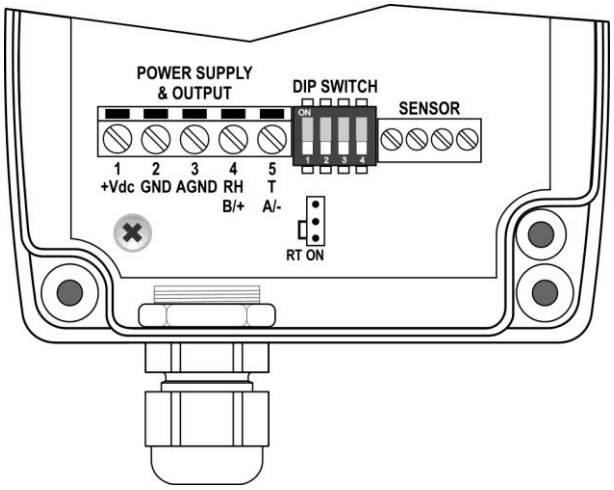


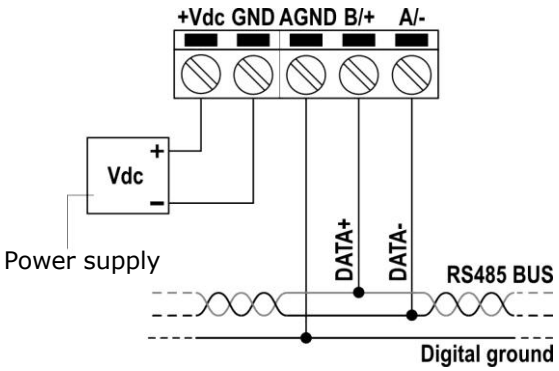
Models with 0…10 V or active 0/4…20 mA analog output (HVAC40V17…, HVAC4017…)



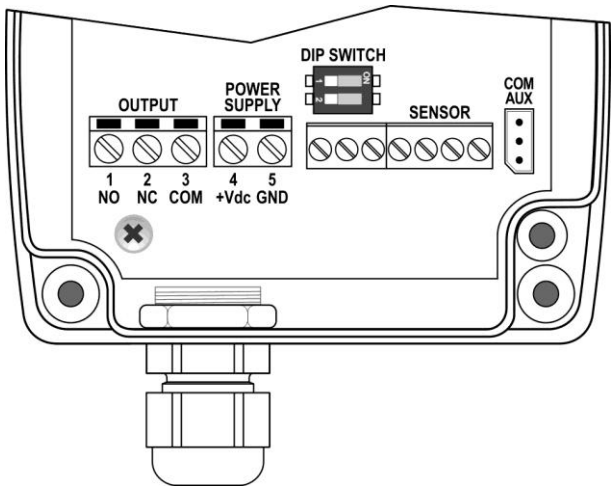


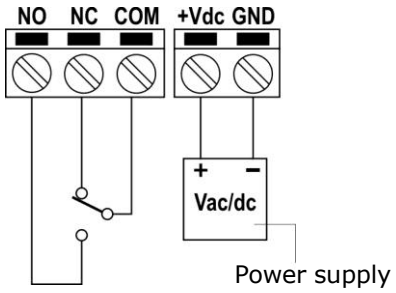
Models with 2-wire current output (HVAC40A17…)





Models with digital RS485 output (HVAC40S17…)





Models with ON/OFF relay switch output (HVAC40R17…)

Analog outputs:
The load resistance R_L varies according to the type of analog output:

Analog output	Load resistance
0…10 V	> 10 kΩ
0/4…20 mA active	< 500 Ω
4…20 mA 2-wire (current loop)	< (Vdc – 12) / 0.022 Vdc is in V, the result in in Ω

In the event of an anomaly in the measurement (detected measurement outside the measuring range), the output goes to a value 10% higher than the full scale: 11 V if the output is 0...10 V, 22 mA if the output is 0/4…20 mA.

RS485 output:
The output is not isolated. Before connecting the transmitter to the RS485 network, set the address and the communication parameters, if different from the factory preset (see "Configuration" chapter).

The instrument has a built-in line termination that can be connected or removed through the **RT** short jumper placed at the bottom of the electronic board. If the instrument is the last or the first device of a network group, connect the termination by placing the short jumper on the "RT ON" side. If the instrument is not at the end of a network group, disconnect the termination by placing the short jumper on the side opposite to "RT ON".

ON/OFF relay switch output:
The output contact is SPDT. Max. load 3 A/250 Vac, 3 A/30 Vdc resistive load.

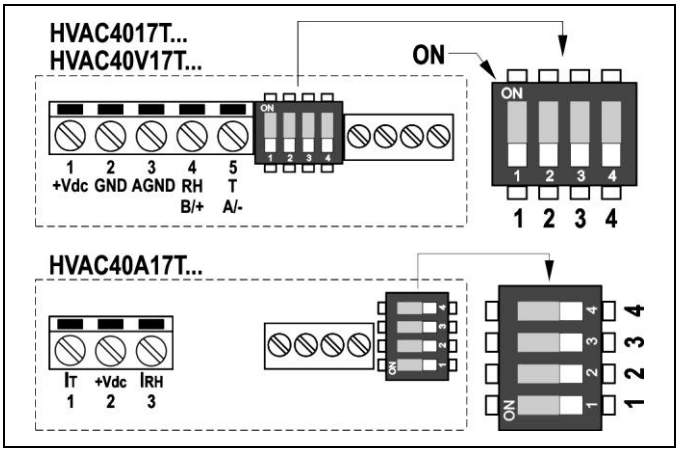
4 Configuration

The configuration can be changed:

- By sending serial commands from a PC, via a standard communication program [▶ p.11].
- Via the dip switches on the circuit board.

4.1 Dip switches in HVAC4017..., HVAC40A17... and HVAC40V17... models

There are 4 preconfigured temperature ranges for the analog output. In order to use a preconfigured temperature range, set the dip switch 1 to ON and set the temperature range with the dip switches 2 and 3, according to the following table:



Dip switch number			Temperature range
1	2	3	
ON	OFF	ON	0…+50 °C
ON	ON	OFF	-20…+50 °C
ON	OFF	OFF	-20…+80 °C
ON	ON	ON	0…+80 °C
OFF	N.U	N.U	Set via serial

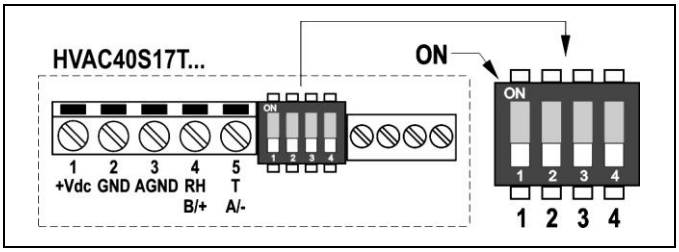
If a temperature range other than the preconfigured ones is desired, it is necessary to set the dip switch 1 to OFF and set the temperature range using the serial commands [▶ p.13].

Note: the 4 preconfigured temperature ranges can also be set with K0…K3 serial commands.

The dip switch 4 selects relative humidity (OFF) or dew point (ON) measurement.

4.2 Dip switches in HVAC40S17... models

The transmitter Modbus address is equal to the sum of the value set with the dip switches (value settable from 0 to 15) and the value set with the serial command MA (value settable from 1 to 216, default = 1). By setting a dip switch to ON (upwards), the following values are added to the address:



	Dip switch number			
	1	2	3	4
ON	8	4	2	1
OFF	0	0	0	0

Example: if the dip switches 1 and 3 are set to ON and the dip switches 2 and 4 are set to OFF, the value set with the dip switches is 8+2=10. If the value set with the serial command MA is 1 (default value), the transmitter Modbus address is 10+1=**11**.

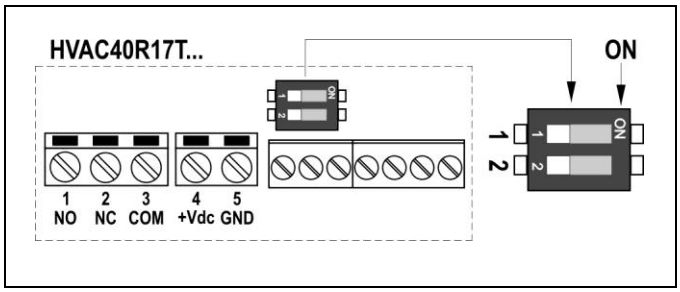
The dip switches can be set even if the transmitter is powered, and the change is effective immediately.

Note: in HVAC40S17… models, the selection of the relative humidity or dew point measurement does not take place via a dip switch but via P0/P1 serial commands.

4.3 Dip switches in HVAC40R17… models

The dip switch 2 selects relative humidity (OFF) or dew point (ON) measurement.

The dip switch 1 is not used.



4.4 Serial commands

1) **HVAC4017…, HVAC40A17…, HVAC40V17… and HVAC40R17… models**
   Connect the COM AUX serial port to a PC USB port via the **CP27** cable. To use the CP27 cable, install the relevant USB drivers on your PC.

   HVAC40S17… models
   Connect the RS485 output to a PC USB port via the **RS48** cable. To use the RS48 cable, install the relevant USB drivers on your PC.

2) On the PC, launch a standard serial communication software and set the baud rate to 115200, the communication parameters to 8N2 and the COM port number to which the instrument is connected.

3) **Only for HVAC40S17… models**, power cycle the instrument and send the command **@** within 10 seconds from the instrument power on.

4) If necessary, send the **CAL START** command. The CAL START command enables the use of some commands, specified in the tables below. The command CAL START is automatically disabled after 5 minutes of inactivity or if the CAL END command or an incorrect command is sent.

5) Send the setting or reading commands given below.

6) **Only for HVAC40S17… models**, power cycle the instrument to restore the Modbus-RTU protocol.

Instrument general information

Command	Description
G0	Reads the instrument model If the instrument has analog output, the instrument model is followed by the current output setting (output lower analog value and temperature range associated with the output) Example of reply: HVAC40A17TC.2_4 -20 / 80 °C (output lower analog value = 4 mA, temperature range associated with the output = -20 / 80 °C)
GF	Similar to G0, but provides the configuration of the analog output set via serial
GS	Similar to G0, but provides the configuration of the analog output set via dip switches
G2	Reads the instrument serial number
G3	Reads the instrument firmware version
G4	Reads the instrument firmware date

Measurement

Command	Description
F0	Disables filtering of measurements (the last instantaneous measurement is provided)
F1	Enables filtering of measurements (default, a weighted average of the last measurements is provided)
G9	Reads whether filtering of measurements is enabled (Filter:1) or disabled (Filter:0)
P0	Sets relative humidity as humidity measurement (default). **Only HVAC40S17…**
P1	Sets dew point as humidity measurement. **Only HVAC40S17…**
GP	Reads the type of measurement set for humidity: relative humidity (0) or dew point (1). **Only HVAC40S17…**
U3	Displays the temperature measurement on LCD
U4	Displays the humidity measurement on LCD (relative humidity or dew point depending on the setting)
U5	Alternates the temperature and humidity measurements on LCD
UC	Sets °C as temperature unit of measurement (default)
UF	Sets °F as temperature unit of measurement
GU	Reads the temperature unit of measurement
GM	Reads the current measurement (not available in HVAC40S17… models) The measurements are provided without the decimal point and in the sequence temperature, relative humidity and dew point Example of reply: 00230;C; 264;00032;Td C; (23.0 °C; 26.4 %UR; 3.2 °C Td)

Analog output (only HVAC4017…, HVAC40A17… and HVAC40V17… models)

Command	Description
U0	Sets 0…20 mA as current analog output
U1	Sets 4…20 mA as current analog output (default)
AIsnnn	Associates the initial scale of temperature analog output with snnn ("s" is the sign of the value) (*) Default: -200 (=-20.0 °C)
ASsnnn	Associates the full scale of temperature analog output with snnn ("s" is the sign of the value) (*) Default: +800 (=+80.0 °C)
AG	Reads the temperature range associated with the analog output Example of reply: User Analog Scale: -200 / +800 C (-20.0…+80.0 °C)
KU	Enables the temperature range set with the AIsnnn and ASsnnn commands
K0	Enables the -20…+80 °C temperature range
K1	Enables the -20…+50 °C temperature range
K2	Enables the 0…+50 °C temperature range
K3	Enables the 0…+80 °C temperature range

(*) The value must be written without the decimal point, even if it is not an integer value (e.g., to associate 50.0 °C with the full scale of analog output, write AS+500). The value is considered in the unit of measurement set in the instrument.

The temperature range set with the AIsnnn and ASsnnn commands is active only if it is enabled with the KU command and the dip switch 1 is set to OFF.

Modbus-RTU protocol (only HVAC40S17… models)

Command	Description
MA nnn	Sets the address to nnn (1…247, default=1)
L1	Reads the address
MB n	Sets the Baud Rate: ▪ 9600 if n=0 ▪ 19200 if n=1 (default) ▪ 38400 if n=2 ▪ 57600 if n=3 ▪ 115200 if n=4
L2	Reads the Baud Rate
MP n	Sets parity and stop bits (data bits = 8 fixed): ▪ 8N1 if n=0 ▪ 8N2 se n=1 ▪ 8E1 if n=2 (default) ▪ 8E2 se n=3 ▪ 8O1 if n=4 ▪ 8O2 se n=5
L3	Reads the setting of parity and stop bits
MW n	Sets waiting time after transmission: ▪ Immediate reception if n=0 (violates protocol) ▪ Waiting 3.5 characters if n=1 (default, respects protocol)
L4	Reads the setting of waiting time after transmission

Alarm (only HVAC40R17… models)

The commands starting with **AW** require prior sending of the **CAL START** command.

The threshold values refer to the relative humidity measurement or the dew point measurement depending on the humidity measurement selected (via P0/P1 serial commands for HVAC40S17… models, via dip switch for the other models).

Command	Description
AWSn	Sets the relay operating mode n=0 ⇒ Negative (NC contact is closed if no alarm, NO contact is closed if in alarm) n=1 ⇒ Positive (NO contact is closed if no alarm, NC contact is closed if in alarm) Default: Negative
ARS	Reads the relay operating mode
AWBn	Sets the buzzer activation status: n=0 ⇒ OFF (default); n=1 ⇒ ON
ARB	Reads the buzzer activation status
AWAn	Sets the alarm activation status: n=0 ⇒ OFF (default); n=1 ⇒ ON
ARA	Reads the alarm activation status
AWEn	Sets the alarm operating mode n=0 ⇒ Above threshold (alarm is on if measurement is greater than threshold 1) n=1 ⇒ Below threshold (alarm is on if measurement is less than threshold 1) n=2 ⇒ Outside thresholds (alarm is on if measurement is less than threshold 1 or greater than threshold 2) Default: Above threshold
ARE	Reads the alarm operating mode
AWT1snnn	Sets the threshold 1 value to snnn ("s" is the sign of the value) (*) Default: 300 (=30.0 %RH)
ART1	Reads the threshold 1 value
AWT2snnn	Sets the threshold 2 value to snnn ("s" is the sign of the value) (*) Default: 700 (=70.0 %RH)
ART2	Reads the threshold 2 value
AWHnnn	Sets the hysteresis value to nnn (*) Default: 100 (=10.0 %RH)
ARH	Reads the hysteresis value
AWD1nnn	Sets the alarm activation delay to nnn seconds (0… 600 s) Default: 0
ARD1	Reads the alarm activation delay value
AWD2nnn	Sets the alarm deactivation delay to nnn seconds (0… 600 s) Default: 0
ARD2	Reads the alarm deactivation delay value

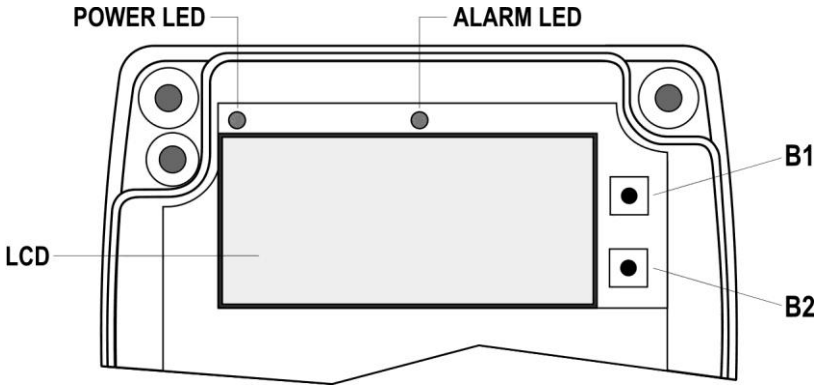
(*) The value must be written without the decimal point, even if it is not an integer value (e.g., to set thresholds 1 to 15.0 %RH, write AWT1+150). In the case of the dew point measurement, the thresholds and hysteresis values are considered in the unit of measurement set in the instrument.

Relative humidity calibration

The commands starting with **R** require prior sending of the **CAL START** command.

Command	Description
GC	Reads the calibration type in use: factory or user
GD	Reads the factory calibration date (format yyyy/mm/dd hh.mm.ss)
GE	Reads the user calibration date (format yyyy/mm/dd hh.mm.ss)
R0 vvv	Calibrates the relative humidity lower point to the value vv.v %RH The value must be between 300 (=30.0 %RH) and 350 (=35.0 %RH)
R1 vvv	Calibrates the relative humidity upper point to the value vv.v %RH The value must be between 730 (=73.0 %RH) and 770 (=77.0 %RH)
RU0	Uses the factory calibration
RU1	Uses the user calibration
RR	Resets the user calibration to the factory calibration
RD yymmddhhmmss	Sets the user calibration date

4.5 Configuration via internal buttons in HVAC40R17… models



The upper button **B1** allows scrolling the available operating parameters, while the lower button **B2** allows changing the setting of the selected parameter.

The function of a button depends on whether it is short or long pressed. To short press a button, hold it down for about 1 second, until the power LED turns off. To long press a button, hold it down for at least 3 seconds, until the power LED turns off and then turns on again.

Long press the upper button **B1** to enter the menu. Inside the menu, long press **B1** to scroll the available parameters. Below is the sequence of the operating parameters (in brackets the indication that appears on the display) with the possible settings for non-numerical parameters:

- **Relay operating mode** (SECU):
  - Negative (NEG): NC contact is closed if no alarm, NO contact is closed if in alarm
  - Positive (POS): NO contact is closed if no alarm, NC contact is closed if in alarm
- **Buzzer activation** (BEEP):
  - OFF: buzzer disabled
  - ON: buzzer enabled
- **Alarm activation** (ALAR):
  - OFF: alarm disabled
  - ON: alarm enabled
- **Alarm operating mode** (EDGE):
  - Above threshold (RISE): alarm is on if measurement is greater than threshold 1
  - Below threshold (FALL): alarm is on if measurement is less than threshold 1
  - Outside thresholds (OUTS): alarm is on if measurement is less than threshold 1 or greater than threshold 2
- **Threshold 1** (THR1): Value of the threshold for above (RISE) and below (FALL) alarm operating modes; value of the lower threshold for outside thresholds (OUTS) alarm operating mode.
- **Threshold 2** (THR2): Value of the upper threshold for outside thresholds (OUTS) alarm operating mode. The parameter appears only if the alarm operating mode is set to OUTS.
- **Hysteresis** (HYST): Value of the hysteresis for above (RISE) and below (FALL) threshold alarm operating modes. The parameter does not appear if the alarm operating mode is set to OUTS.

- **Alarm activation delay** (T1): Value in seconds of the time delay for generating the alarm. The alarm is generated only if the measurement exceeds the threshold for more than the set time.
- **Alarm deactivation delay** (T2): Value in seconds of the time delay for deactivating the alarm. The alarm is deactivated only after the set time has elapsed from the disappearance of the alarm condition.

Note: the threshold values refer to relative humidity or dew point measurement depending on the humidity measurement selected with the dip switch [▶ p.11].

Note: the EDGE, THR1, THR2, HYST, T1 and T2 parameters do not appear if the alarm is set to OFF.

Changing non-numerical parameters:

- Select the parameter by using the button **B1**.
- Short press the button **B2** to change the setting.
- Long press the button **B1** to move to the next parameter.

Changing numerical parameters:

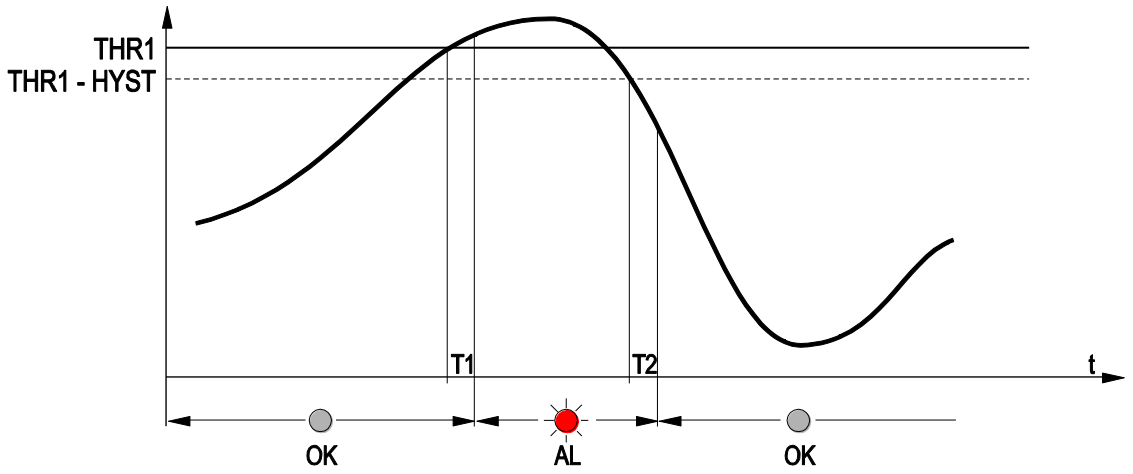
- Select the parameter by using the button **B1**.
- Short press the button **B2** to change the sign.
- Long press the button **B2** to select the first digit.
- Short press the button **B2** to change the selected digit.
- Long press the button **B2** to select the next digit.
- Repeat the above two steps until all the digits are set.
- Long press the button **B1** to move to the next parameter.

While a parameter value is displayed, a short press of the button **B1** will briefly show the name of the currently selected parameter.

5 Alarm operating modes (HVAC40R17…)

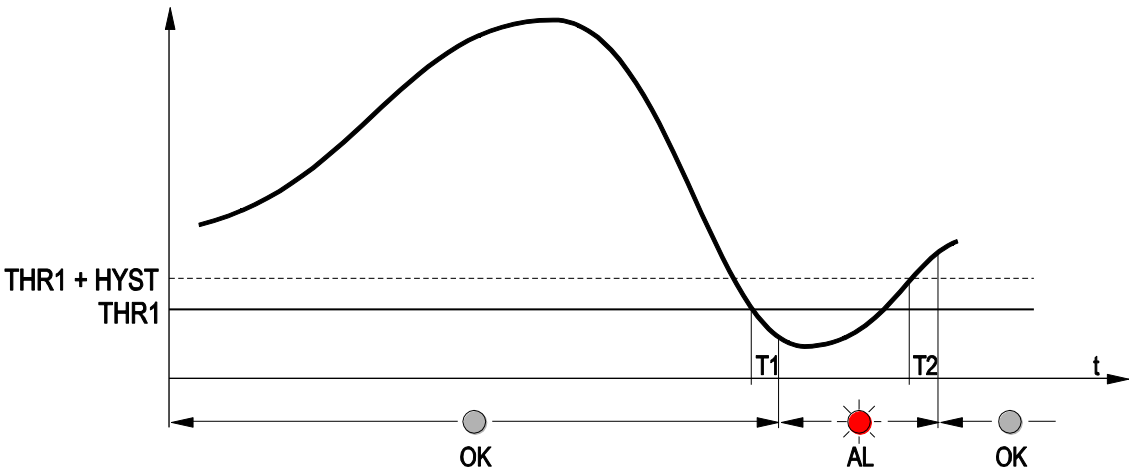
Above threshold (RISE): the alarm is turned on if the measurement is greater than threshold 1 for more than T1 seconds. The alarm is turned off when the measurement becomes less then threshold 1 minus the hysteresis for more than T2 seconds.

The up arrow on the left of the display is shown when this mode is selected.



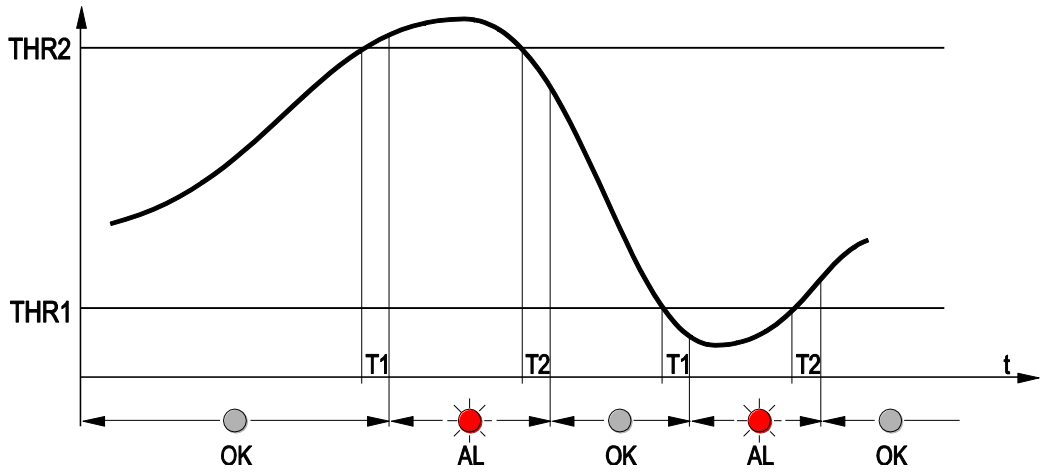
Below threshold (FALL): the alarm is turned on if the measurement is less than threshold 1 for more than T1 seconds. The alarm is turned off when the measurement becomes greater then threshold 1 plus the hysteresis for more than T2 seconds.

The down arrow on the left of the display is shown when this mode is selected.



Outside thresholds (OUTS): the alarm is turned on if the measurement is greater than threshold 2 or less than threshold 1 for more than T1 seconds. The alarm is turned off when the measurement returns between the two thresholds for more than T2 seconds. No hysteresis is applied to the thresholds.

The up and down arrows on the left of the display are shown when this mode is selected.



When the measurement is in alarm, the red LED lights up, the buzzer is on (if enabled) and the relay is switched (depending on the chosen relay operating mode).

While in alarm, the buzzer can be stopped (only for the current event) by short pressing the button B1.

The alarm is disabled while in the configuration menu.

6 Modbus-RTU protocol (HVAC40S17…)

By default, the instrument has Modbus address 1 and communication parameters 19200, 8E1. The address and the communication parameters can be changed by using the MA, MB and MP serial commands.

Below is the list of registers.

Input Registers

Address	Description	Format
0	Temperature in °C (x10)	16-bit integer
1	Temperature in °F (x10)	16-bit integer
2	Relative Humidity in % (x10)	16-bit integer
3	Dew Point in °C (x10)	16-bit integer
4	Dew Point in °F (x10)	16-bit integer
5	Status register: Bit 0 = 1 ⇒ temperature measurement error Bit 1 = 1 ⇒ relative humidity measurement error Bit 2 = 1 ⇒ dew point measurement error Bit 3 = 1 ⇒ configuration data error	16-bit integer

7 Maintenance

In order to grant measurements high accuracy, it is necessary to clean the filter periodically.

To clean the filter, unscrew it from the probe body and wash it under running water with the help of a brush. Dry the filter and screw it back to the probe body.

Warning: after removing the filter, be careful not to touch the RH sensor with your hands, so as not to damage it irreparably.

If the filter is too dirty to be able to clean, it can be replaced with a new one.

Do not use aggressive cleaning agents or incompatible with the materials indicated in the technical specifications. For cleaning the housing, use a soft dry cloth or slightly dampened with clean water.

8 Safety instructions

The transmitter proper operation and operating safety can be ensured only in the climatic conditions specified in this manual and if all standard safety measures as well as the specific measures described in this manual are followed.

Do not use the instrument in places where there are:

- Corrosive or flammable gases.
- Direct vibrations or shocks to the instrument.
- High-intensity electromagnetic fields, static electricity.

User obligations

The transmitter operator shall follow the directives and regulations below that refer to the treatment of dangerous materials:

- EU directives on workplace safety.
- National law regulations on workplace safety.
- Accident prevention regulations.

9 Accessories ordering codes

PC connecting cable and fixing accessories must be ordered separately.

Fixing accessories

HD9008.31 Wall flange with cable gland to fix Ø 14 mm probes.

PG16 AISI304 cable gland to fix Ø 14 mm probes. G ½", L=8 mm thread.

PC connecting cables

CP27 PC connecting cable for the transmitter configuration. With built-in RS232/USB converter. 3-pole connector on transmitter side and A-type USB connector on PC side. **For HVAC4017…, HVAC40A17…, HVAC40R17… and HVAC40V17…**

RS48 PC connecting cable for the transmitter configuration. With built-in RS485/USB converter. 3 open wires on transmitter side and A-type USB connector on PC side. **For HVAC40S17…**

Saturated solutions

HD75 Saturated solution for checking the Relative Humidity sensor at 75% RH. Includes screw adaptor for ∅14 mm probes.

HD33 Saturated solution for checking the Relative Humidity sensor at 33% RH. Includes screw adaptor for ∅14 mm probes.

HD11 Saturated solution for checking the Relative Humidity sensor at 11% RH. Includes screw adaptor for ∅14 mm probes.

Spare parts

P8 Filter in PBT with 10 µm stainless steel grid.

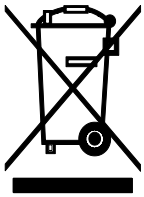
WARRANTY

The manufacturer is required to respond to the "factory warranty" only in those cases provided by Legislative Decree 6 September 2005 - n. 206. Each instrument is sold after rigorous inspections; if any manufacturing defect is found, it is necessary to contact the distributor where the instrument was purchased from. During the warranty period (24 months from the date of invoice) any manufacturing defects found will be repaired free of charge. Misuse, wear, neglect, lack or inefficient maintenance as well as theft and damage during transport are excluded. Warranty does not apply if changes, tampering or unauthorized repairs are made on the product. Solutions, probes, electrodes and microphones are not guaranteed as the improper use, even for a few minutes, may cause irreparable damages.
The manufacturer repairs the products that show defects of construction in accordance with the terms and conditions of warranty included in the manual of the product. For any dispute, the competent court is the Court of Padua. The Italian law and the "Convention on Contracts for the International Sales of Goods" apply.

TECHNICAL INFORMATION

The quality level of our instruments is the result of the continuous product development. This may lead to differences between the information reported in the manual and the instrument you have purchased.
We reserve the right to change technical specifications and dimensions to fit the product requirements without prior notice.

DISPOSAL INFORMATION



Electrical and electronic equipment marked with specific symbol in compliance with 2012/19/EU Directive must be disposed of separately from household waste. European users can hand them over to the dealer or to the manufacturer when purchasing a new electrical and electronic equipment, or to a WEEE collection point designated by local authorities. Illegal disposal is punished by law.

Disposing of electrical and electronic equipment separately from normal waste helps to preserve natural resources and allows materials to be recycled in an environmentally friendly way without risks to human health.

CE RoHS

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